Algebra 2 Modeling Quadratic Functions: Average Rate of Change

**Answer all questions on a separate sheet of paper.**

1. Remember the ball that was thrown from the top of a building from an earlier problem? The height **h(t)**, in feet above the ground, of the ball thrown into the air from the top of a building was given by the function **h(t) = -16(t - 2)2 + 264**, where t is the number of seconds the ball has been in the air.

1. sketch a graph of the function h(t) for 0 < t < 6.062
2. MC900155561[1]Find the speed (in feet per second) of the ball from t = 5 seconds

to t = 6 seconds.

1. Now convert the speed to miles per hour.
2. Find the speed (in feet per second) of the ball from t = 6

seconds to t = 6.062 seconds when it hits the ground.

1. Now convert the speed as it hits the ground to miles per hour.

2. He Chong is an Olympic springboard diver and the equation that models his height (in feet) above water at time t (in seconds) after he takes off is .

a. Use your graphing calculator to draw a sketch of the function.

b. How long after he takes off does he reach his maximum?

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d. Find his speed as he approaches the water by calculating the average rate of change

between t = 1 second and t = 1.329 seconds.

e. Convert his speed as he hits the water to miles per hour.

3. Shelly throws her keys up in the air to her brother standing on a balcony above her. The function models the height (in feet) of the keys as a function of time, in seconds, the keys are in the air.

a. Use your graphing calculator to draw a sketch of the function.

b. What maximum height do the keys reach?

c. If her brother’s outstretched arms are 16 ft above the ground, at what time(s) can he catch the keys?

d. Find the speed (in mph) of the keys at the time(s) the brother can catch the keys by calculating the average rate of change.